

1. An ocular composition comprising doxycycline at a concentration from about 0.01 µg/ml to about 30 mg/ml and a steroid at a concentration from about 0.1 mg/ml to about 40 mg/ml in a pharmaceutically acceptable formulation for ocular administration.

2. The composition of claim 1 formulated for administration by at least one of topical administration, intravitreal injection, sub-conjunctival injection, sub-Tenon injection, retrobulbar injection, or implantation.

3. The composition of claim 1 formulated as at least one of a liposome, microcapsule, or microsphere.

4. The composition of claim 1 wherein the steroid is selected from the group consisting of triamcinolone, betamethasone, budesonide, cortisone, dexamethasone, hydrocortisone, methylprednisolone, prednisolone, prednisone, fluorometholone, rimexolone, medrysone, lotoprednol etabonate, 11-

5 desoxycortisol, anacortave acetate, and combinations thereof.

5. The composition of claim 1 wherein the steroid is prednisolone acetate and the composition is formulated for topical ocular administration.

6. The composition of claim 1 wherein the steroid is 11-desoxycortisol and the composition is formulated for at least one of topical ocular administration or injectable ocular administration.

7. The composition of claim 1 further comprising an agent selected from the group consisting of heparin, an antimicrobial, an anti-prostaglandin, a metalloproteinase inhibitor, and combinations thereof.

8. An ocular composition comprising heparin in a concentration from about 0.01 µg/ml to about 30 mg/ml and a steroid at a concentration from about 0.1 mg/ml to about 40 mg/ml in a pharmaceutically acceptable formulation for ocular administration.

9. The composition of claim 8 formulated for administration by at least one of topical administration, intravitreal injection, sub-conjunctival injection, sub-Tenon injection, retrobulbar injection, or implantation.

10. The composition of claim 8 formulated as at least one of a liposome, microcapsule, or microsphere.

11. The composition of claim 8 wherein the steroid is selected from the group consisting of triamcinolone, betamethasone, budesonide, cortisone, dexamethasone, hydrocortisone, methylprednisolone, prednisolone, prednisone, fluorometholone, rimexolone, medrysone, lotoprednol etabonate, 11-

5 desoxycortisol, anacortave acetate, and combinations thereof.

12. The composition of claim 8 wherein the steroid is prednisolone acetate and the heparin is low molecular weight heparin, and the composition is in a formulation for topical ocular administration.

13. The composition of claim 8 wherein the steroid is 11-desoxycortisol and the heparin is low molecular weight heparin, and the composition is in a formulation for at least one of topical ocular administration or injectable ocular administration.

14. The composition of claim 1 further comprising an agent selected from the group consisting of an antimicrobial, an anti-prostaglandin, a metalloproteinase inhibitor, and combinations thereof.

15. An ocular composition comprising doxycycline in a concentration from about 0.01 µg/ml to about 30 mg/ml and heparin in a concentration from about 0.01 µg to about 30 mg/ml in a pharmaceutically acceptable formulation for ocular administration.

16. The composition of claim 15 formulated for administration by at least one of topical administration, intravitreal injection, sub-conjunctival injection, sub-Tenon injection, retrobulbar injection, or implantation.

17. The composition of claim 15 formulated as at least one of a liposome, microcapsule, or microsphere.

18. The composition of claim 15 further comprising an agent selected from the group consisting of at least one additional antimicrobial, an anti-prostaglandin, a metalloproteinase inhibitor, and combinations thereof.

19. The composition of claim 18 wherein the anti-prostaglandin is selected from at least one of indomethacin, ketorolac tromethamine, meclofenamate, flurbiprofen, and a pyrrolo-pyrrole of non-steroidal anti-inflammatory drugs.

20. The composition of claim 15 wherein the heparin is low molecular weight heparin.

21. A method for reducing ocular neovascularization in a patient comprising administering to an eye of a patient a pharmaceutically acceptable composition comprising a steroid and at least one of doxycycline or heparin in a therapeutically effective amount for a duration sufficient to reduce ocular
- 5 neovascularization.
22. The method of claim 21 further comprising administering at least one of an anti-prostaglandin, a metalloproteinase inhibitor, or an antimicrobial.
23. The method of claim 21 wherein the composition is administered by at least one of topical administration, injection, or implantation.
24. The method of claim 21 wherein the heparin is low molecular weight heparin.
25. The method of claim 21 where neovascularization remains inhibited throughout the treatment duration.
26. The method of claim 21 wherein the composition is substantially non-toxic.
27. The method of claim 21 effecting vascular regression.

28. A method for reducing ocular neovascularization in a patient comprising administering to an eye of a patient a pharmaceutically acceptable formulation of a composition comprising at least one of doxycycline or heparin in a therapeutically effective amount sufficient to reduce ocular neovascularization  
5 in the absence of a steroid.

29. The method of claim 28 further comprising administering at least one of an anti-prostaglandin, a metalloproteinase inhibitor, an antibiotic, and combinations thereof.

30. The method of claim 28 further comprising administering an anti-prostaglandin at a concentration in the range of about 0.003%<sup>w/w</sup> to about 0.3%<sup>w/w</sup>.

31. The method of claim 28 wherein at least  $\pm$  inhibition of neovascularization occurs.

32. The method of claim 28 wherein the composition is administered by at least one of topical administration, injection, or implantation.

33. The method of claim 28 where neovascularization remains inhibited throughout the treatment duration.

34. The method of claim 28 wherein the composition is substantially non-toxic.

35. The method of claim 28 wherein an extended release formulation is administered.

36. The method of claim 28 administered to a patient post glaucoma filtering surgery.

37. The method of claim 28 effecting vascular regression.



38. A method of reducing ocular neovascularization comprising topically providing to an eye a pharmaceutically acceptable formulation of a composition comprising doxycycline and heparin for a duration sufficient to reduce ocular neovascularization.

39. The method of claim 38 wherein the concentration of doxycycline ranges from about 0.1 mg/ml to about 30 mg/ml.

40. The method of claim 38 wherein the heparin is low molecular weight heparin.

41. The method of claim 38 wherein the concentration of heparin ranges from about 0.1 mg/ml to about 30 mg/ml.

42. The method of claim 38 for reducing neovascularization in at least one of a cornea, retina, conjunctiva, or choroid.

43. A method of reducing ocular neovascularization in a patient having or at risk for developing glaucoma comprising administering to the patient a pharmaceutically acceptable formulation comprising at least one of doxycycline or heparin in the absence of a steroid in a concentration and for a duration  
5 sufficient to inhibit ocular neovascularization.

44. The method of claim 43 further comprising administering an anti-prostaglandin selected from the group consisting of indomethacin, ketorolac tromethamine, meclofenamate, fluorbiprofen, and pyrrolo-pyrrole non-steroidal anti-inflammatory drugs.

45. The method of claim 43 where neovascularization remains reduced throughout the treatment duration.

46. A tumor treatment regimen cycle comprising the steps of

(a) intravenously administering a steroid for about one to about two weeks immediately following a chemotherapy and/or radiation, photo, or thermal therapy treatment dose, the steroid administration followed by a systemically

5 administered composition comprising a steroid and doxycycline,

(b) administering a composition comprising doxycycline and heparin for about one to about two weeks, and

(c) administering a composition comprising doxycycline, anti-prostaglandin, and an antibiotic for about one to about two weeks.

47. The treatment regimen of claim 46 wherein (b) further comprises administering at least one chemotherapeutic agent.

48. The treatment regimen of claim 46 wherein heparin is low molecular weight heparin.

49. The treatment regimen of claim 46 wherein the steroid in (a) is selected from the group consisting of triamcinolone, betamethasone, budesonide, cortisone, dexamethasone, hydrocortisone, methylprednisolone, prednisolone, prednisone, fluorometholone, rimexolone, medrysone, lotoprednol  
5 etabonate, 11-desoxycortisol, anacortave acetate, and combinations thereof.

50. The treatment regimen of claim 46 further comprising repeating (a), (b), and (c) until at a decrease in at least one of a tumor marker, tumor size, or combinations thereof is effected.

51. The treatment regimen of claim 46 further comprising intravenously administering for about one week to about two weeks a steroid followed by a systemically administered composition comprising a steroid and doxycycline, and thereafter repeating (b) and (c).